AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1.   (currently amended): A transport layer relay method performed by a transport layer relay device, the method comprising:

terminating, at the transport layer relay device, a first transport layer connection between a first source terminal and a first destination terminal at a first transmission rate in the transport layer and a second transport layer connection between a second source terminal and a second destination terminal at a second transmission rate in the transport layer;

relaying data flow of said first transport layer connection to said first destination terminal as a first relay connection and data flow of said second transport layer connection to said second destination terminal as a second relay connection to respectively separate said first and second transport layer connections;

determining a total transmission rate of said first and second relay connections based on the first and second transmission rates;

determining a first reallocated transmission rate and a second reallocated transmission rate, the first reallocated transmission rate and the second reallocated transmission rate apportioned from the total transmission rate; and

allocating the total transmission rate among the determined first reallocated transmission rate to each of said first relay connection and the determined second reallocated transmission rate to said second relay connection connections,

wherein the first source terminal, the second source terminal, the first destination

terminal, and the second destination terminal are different from each other.

2.   (previously presented): The method according to claim 1, wherein said total

transmission rate is determined in accordance with the number of transport layer connections that

are being relayed and congestion conditions of a network through which the relay connections

pass.

3.   (previously presented): The method according to claim 1, wherein said total

transmission rate is determined in accordance with the number of transport layer connections that

are being relayed and congestion conditions of a network through which the relay connections

pass such that desired effective transmission rates are attained for each relay connection.

4.   (previously presented): The method according to claim 1, wherein said total

transmission rate is determined in accordance with the number of transport layer connections that

are being relayed and congestion conditions of a network through which the relay connections

pass such that effective transmission rates are attained for each relay connection , and

wherein transmission rates for traffic, other than the relay connections, that shares a

bottleneck with the relay connections are allocated differently than transmission rates allocated

to the relay connections.

5.   (previously presented): The method according to claim 1, wherein said total

transmission rate is allocated to transmission rates of each of said first and second relay

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connections depending on application information in said data flow of each of said first and

second relay connections.

6.   (previously presented): The method according to claim 1, further comprising

estimating, by means of measurement packets, congestion conditions of a network through which

the first and second relay connections pass,

wherein said congestion conditions are used to determine said total transmission rate.

7.   (previously presented): The method according to claim 1, further comprising

estimating, by means of relay packets, congestion conditions of a network through which the first

and second relay connections pass,

wherein said congestion conditions are used to determine said total transmission rate.

8.   (currently amended): A transport layer relay device comprising:

a first terminal-side connection termination unit that terminates a first transport layer

connection between a first source terminal and a first destination terminal in a transport layer;

a second terminal-side connection termination unit that terminates a second transport

layer connection between a second source terminal and a second destination terminal in a

transport layer;

a first interdevice connection termination unit that terminates a first transport layer

connection with a first transport layer relay device that relays transport layer data between said

first terminal-side connection termination unit and said first interdevice connection termination

unit;

a second interdevice connection termination unit that terminates a second transport layer

connection between a second transport layer device that relays transport layer data between said

second terminal-side connection termination unit and said second interdevice connection

termination unit; and

a transmission rate control unit that controls transmission rates of said first and second

interdevice connection termination units,

wherein the transmission rate control unit determines a total transmission rate of all

interdevice connection termination units, ~~allocates~~ determines a first reallocated transmission

rate and a second reallocated transmission rate, the first reallocated transmission rate and the

second reallocated transmission rate apportioned from said total transmission rate, allocates

~~among~~ the determined first reallocated transmission rate to said first interdevice connection

termination unit and the determined second reallocated transmission rate to said second

interdevice connection termination ~~units~~unit, and reports a transmission rate that has been .

allocated to said first and second interdevice connection termination units, said first interdevice

connection termination unit relaying said first transport layer connection to said first destination

terminal as a first relay connection based on said first reallocated ~~allocated total~~ transmission rate

and said second interdevice connection termination unit relaying said second transport layer

connection to said second destination terminal as a second relay connection based on said second

reallocated ~~allocated total~~ transmission rate, and

wherein the first source terminal, the second source terminal, the first destination

terminal, and the second destination terminal are different from each other.

9.   (previously presented): The device according to claim 8, wherein said

transmission rate control unit determines said total transmission rate in accordance with the

number of transport layer connections that are being relayed and connection-specific congestion

information reported from each interdevice connection termination unit.

10.   (previously presented): The device according to claim 8, wherein said

transmission rate control unit determines said total transmission rate in accordance with the

number of transport layer connections that are being relayed and connection-specific congestion

information reported from each interdevice connection termination unit such that effective

transmission rates for each relay connection attain a desired transmission rate.

11.   (previously presented): The device according to claim 8, wherein said

transmission rate control unit determines said total transmission rate in accordance with the

number of transport layer connections that are being relayed and connection-specific congestion

information reported from each interdevice connection termination unit such that effective

transmission rates for each relay connection are attained, and

        wherein transmission rates for traffic, other than the relay connections, that shares a

bottleneck with the relay connections are allocated differently than transmission rates allocated

to the relay connections.

12.   (previously presented): The device according to claim 8, further comprising:

an application information analysis unit that, when relaying transport layer data between

each of said first and second terminal-side connection termination units and each of said first and

second interdevice connection termination units, analyzes application information in said

transport layer data,

wherein said transmission rate control unit allocates said total transmission rate among

the transmission rates of each of said first and second relay connections based on the application

information analyzed by said application information analysis unit.

13.　　(previously presented): The device according to claim 8, further comprising:

a network condition estimation unit that, based on measurement packets, estimates

congestion conditions of a network through which said first and second relay connections pass,

wherein said transmission rate control unit uses the congestion conditions estimated by

said network condition estimation unit to determine said total transmission rate.

14.　　(previously presented): The device according to claim 8, further comprising:

an inline measurement unit that, by means of packets that are relayed, estimates

congestion conditions of a network through which said first and second relay connections pass,

wherein said transmission rate control unit uses the results estimated by said inline

measurement unit to determine said total transmission rate.

15.　　(currently amended): A transport layer relay method performed by a transport

layer relay device, the method comprising:

terminating, at the transport relay device, each of a plurality of transport layer

connections in a first transport layer and each of a plurality of transport layer connections in a

second transport layer;

grouping the plurality of connections in the first transport layer into a first relay

connection in the first transport layer and the plurality of connections in the second transport

layer into a second relay connection in the second transport layer;

determining a total transmission rate of the first and second relay connections;

determining a first reallocated transmission rate and a second reallocated transmission

rate, the first reallocated transmission rate and the second reallocated transmission rate

apportioned from the total transmission rate;

allocating ~~the total transmission rate among~~ the determined first reallocated transmission

rate to ~~each of~~ said first relay connection and the determined second reallocated transmission rate

to said second relay ~~connections~~connection,

wherein the plurality of connections in said first transport layer are grouped as the first

relay connection in accordance with ~~a~~the first reallocated transmission rate allocated from the

total transmission rate and the plurality of connections in the second transport layer are grouped

as the second relay connection in accordance with ~~a~~the second reallocated transmission rate

allocated from the total transmission rate.

16.   (previously presented): The method according to claim 15, wherein said total

transmission rate is determined in accordance with the number of transport layer connections that

are being relayed and congestion conditions of a network through which the relay connections

pass.

17.   (previously presented): The method according to claim 15, wherein said total

transmission rate is determined in accordance with the number of transport layer connections that

are being relayed and congestion conditions of a network through which the relay connections

pass such that desired effective transmission rates are attained for each relay connection.

18.   (previously presented): The method according to claim 15, wherein said total

transmission rate is determined in accordance with the number of transport layer connections that

are being relayed and congestion conditions of a network through which the relay connections

pass such that effective transmission rates are attained for each relay connection, and

wherein transmission rates for traffic, other than the relay connections, that shares a

bottleneck with the relay connections are allocated differently than transmission rates allocated

to the relay connections.

19.   (previously presented): The method according to claim 15, wherein data flows

from each of said plurality of connections in the first transport layer and the plurality of

connections in the second transport layer are grouped in accordance with transmission rates for

which said total transmission rate has been allocated based on application information in said

plurality of connections in the first transport layer and the plurality of connections in the second

transport layer.

20.   (previously presented): The method according to claim 15 further comprising

estimating, by means of measurement packets, congestion conditions of network through which

the first and second relay connections pass,

      wherein said congestion conditions are used to determine said total transmission rate.

21.   (previously presented): The method according to claim 15 further comprising

estimating, by means of relay packets, congestion conditions of a network through which the first

and second relay connections pass,

      wherein said congestion conditions are used to determine said total transmission rate.

22.   (currently amended): A transport layer relay device comprising:

      a plurality of terminal-side connection termination units that terminate transport layer

connections between a plurality of source terminals and a plurality of destination terminals in the

transport layer;

      an interdevice connection termination unit that terminates a plurality of transport layer

connections with a plurality of transport layer relay devices that relay transport layer data

between said plurality of terminal-side connection termination units and said interdevice

connection termination unit; and

      an MUX-DEMUX unit that groups transport layer data from each of said plurality of

terminal-side connection termination units as a plurality of relay connections and transfers the

plurality of relay connections to said interdevice connection termination unit; and

a transmission rate control unit that determines a total transmission rate of the plurality of

relay connections, determines reallocated transmission rates apportioned from the total

transmission rate, and allocates ~~each~~ the reallocated transmission ~~rate of the plurality of relay~~

~~connections based on the total transmission rate~~rates to the plurality of relay connections,

wherein said interdevice connection termination unit transmits said plurality of relay

connections to said plurality of destination terminals in accordance with the ~~total transmission~~

~~rate~~reallocated transmission rates,

wherein said MUX-DEMUX unit groups data from the plurality of terminal-side

connection termination units in accordance with the reallocated transmission rates allocated by

the transmission rate control unit, and

wherein the transmission rate control unit determines the ~~total transmission~~

~~rate~~reallocated transmission rates of said interdevice connection termination unit and reports the

allocation of the reallocated transmission rates among the plurality of relay connections to said

MUX-DEMUX unit.

23.   (previously presented): The device according to claim 22, wherein said

transmission rate control unit determines said total transmission rate in accordance with the

number of transport layer connections that are being relayed and congestion information of

connections reported from the interdevice connection termination unit.

24.   (previously presented): The device according to claim 22, wherein said

transmission rate control unit determines said total transmission rate in accordance with the

number of transport layer connections that are being relayed and congestion information of

connections reported from the interdevice connection termination unit such that effective

transmission rates for each of the plurality of relay connections attain a desired rate.

25.   (previously presented): The device according to claim 22, wherein said

transmission rate control unit determines said total transmission rate in accordance with the

number of transport layer connections that are being relayed and congestion information of

connections that from each interdevice connection termination unit such that effective rates for

each of the plurality of relay connections are attained , and

wherein transmission rates for traffic, other than relay connections, that share a

bottleneck with the plurality of relay connections are allocated differently than transmission rates

allocated to the relay connections.

26.   (previously presented): The device according to claim 22, further comprising:

an application information analysis unit that analyzes application information in transport

layer data when transport layer data are transferred between each of said terminal-side

connection termination units and said MUX-DEMUX unit[[]],

wherein said transmission rate control unit allocates said total transmission rate among

the transmission rates of each of the plurality of relay connections and reports the allocated

transmission rates to said MUX-DEMUX unit based on the application information analyzed by

said application information analysis unit.

27.   (previously presented): The device according to claim 22, further comprising:

a network condition estimation unit that, by means of measurement packets, estimates

congestion conditions of a network through which plurality of relay connections pass[[]],

wherein said transmission rate control unit uses congestion conditions estimated by said

network condition estimation unit to determine said total transmission rate.

28.   (previously presented): The device according to claim 22, further comprising:

an inline measurement unit that, by means of packets that are relayed, estimates

congestion conditions of a network through which the plurality of relay connections pass[[]],

wherein said transmission rate control unit uses the congestion conditions estimated by

said inline measurement unit to determine said total transmission rate.

29.   (previously presented): The method according to claim 1, wherein, when

establishing a new transport layer connection between a new source terminal and a new

destination terminal, said total transmission rate is determined, said total transmission rate is

allocated to each relay connection, and the allotted transmission rates are reported to a partner

transport layer relay device in establishing said new transport layer connection.

30.   (previously presented): The device according to claim 8, wherein, when

establishing a transport layer connection between a new source terminal and a new destination

terminal, an initial transmission rate is reported to the destination from said transmission rate

control unit.

31.   (previously presented): The method according to claim 15, wherein, when

establishing new transport layer connection between a new source terminal and a new destination

terminal, said total transmission rate is allocated and the allocated transmission rates are reported

to a partner transport layer relay device in establishing said new transport layer connection.

32.   (previously presented): The device according to claim 22, wherein, when

establishing a transport layer connection between a new source terminal and a new destination

terminal, an initial transmission rate that is reported from said transmission rate control unit is

reported to the new destination terminal.

33.   (currently amended): A program embodied on a tangible computer-readable

medium, which when executed by a computer, causes the computer to function as a transport

layer relay device comprising:

a first terminal-side connection termination unit that terminates a first transport layer

connection between a first source terminal and a first destination terminal in a first transport

layer;

a second terminal-side connection termination unit that terminates a second transport

layer connection between a second source terminal and a second destination terminal in a

transport layer;

a first interdevice connection termination unit that terminates a first transport layer

connection with a first transport layer relay device that relays transport layer data between said

first terminal-side connection termination unit and said first interdevice connection termination

unit;

a second interdevice connection termination unit that terminates a second transport layer

connection between a second transport layer device that relays transport layer data between said

second terminal-side connection termination unit and said second interdevice connection

termination unit; and

a transmission rate control unit that controls transmission rates of said first and second

interdevice connection termination units,

wherein the transmission rate control unit determines a total transmission rate of all

interdevice connection termination units, ~~allocates~~ determines a first reallocated transmission

rate and a second reallocated transmission rate, the first reallocated transmission rate and the

second reallocated transmission rate apportioned from said total transmission rate, allocates

~~among~~ the determined first reallocated transmission rate to said first interdevice connection unit

and the determined second reallocated transmission rate to said second interdevice connection

termination ~~units~~ unit, and reports a transmission rate that has been allocated to said first and

second interdevice connection termination units, said first interdevice connection termination

unit relaying said first transport layer connection to said first destination terminal as a first relay

connection based on said first reallocated ~~allocated total~~ transmission rate and said second

interdevice connection termination unit relaying said second transport layer connection to said

second destination terminal as a second relay connection based on said second reallocated

~~allocated total~~ transmission rate, and

wherein the first source terminal, the second source terminal, the first destination

terminal, and the second destination terminal are different from each other.

34.   (currently amended): A program embodied on a tangible computer-readable

medium, which when executed by a computer, causes the computer to function as a transport

layer relay device comprising:

a plurality of terminal-side connection termination units that terminate transport layer

connections between a plurality of source terminals and a plurality of destination terminals in the

transport layer;

an interdevice connection termination unit that terminates a plurality of transport layer

connections with a plurality of transport layer relay devices that relay transport layer data

between said plurality of terminal-side connection termination units and said interdevice

connection termination unit;

a MUX-DEMUX unit that groups transport layer data from each of said plurality of

terminal-side connection termination units as a plurality of relay connections and transfers the

plurality of relay connections to said interdevice connection termination unit; and

a transmission rate control unit that determines a total transmission rate of the plurality of

relay connections, determines reallocated transmission rates apportioned from the total

transmission rate, and allocates ~~each~~ the reallocated transmission ~~rate of the plurality of relay~~

~~connections based on the total transmission rate~~rates to the plurality of relay connections,

wherein said interdevice connection termination unit transmits said plurality of relay

connections to said plurality of destination terminals in accordance with the ~~total transmission~~

~~rate~~reallocated transmission rates,

wherein said MUX-DEMUX unit groups data from the plurality of terminal-side

connection termination units in accordance with the reallocated transmission rates allocated by

the transmission rate control unit, and

wherein the transmission rate control unit determines the ~~total transmission~~

~~rate~~reallocated transmission rates of said interdevice connection termination unit and reports the

allocation of the reallocated transmission rates among the plurality of relay connections to said

MUX-DEMUX unit.